

BUSINESS BENEFITS FROM ENTERPRISE SYSTEMS IMPLEMENTATION IN SMALL AND MEDIUM-SIZED ENTERPRISES

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ABSTRACT

The market for enterprise systems (ESs) continues to grow as business becomes increasingly global and competitive. Increasingly, the market focus for ES vendors is on small businesses. The purpose of this study is to provide a unique ES vendor/consultant perspective on (a) the business benefits small and medium-sized enterprises (SMEs) expect from their ES investment and (b) to examine current practices of ES implementation in SMEs through a conceptual framework that considers the organisational, process and strategic context of the implementation. This study does so with interview data collected from ES vendors, ES consultants and IT research firms, who are the key players in the New Zealand ES industry. A distinctive contribution of this research is the vendor/consultant perspective as the unit of analysis, rather than the SME perspective commonly used in similar research. The vendor/consultant perspective offers a comprehensive viewpoint that extends across numerous SMEs in a variety of industries. Findings from interviews with these professionals indicate that although many ES implementations are several years old now, SMEs have only recently started tracking benefits through analytical processes in expectation to realise business value from their ES investment. The results also identify how ES implementation practices are adapting to be more suitable to the SME sector, an important market for ES vendors given the saturation of the large enterprise market for ES implementation.

Keywords Enterprise System (ES), Enterprise Resource Planning (ERP), Business Benefits, Implementation Practices, Small and Medium-sized Enterprises (SMEs)

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INTRODUCTION

Enterprise systems (ESs), also known as enterprise resource planning (ERP) systems, are highly integrated information systems designed to meet the information needs of organisations and are, in most cases, implemented to improve organisational efficiencies and effectiveness (Davenport, 2000; Hedman & Borell, 2002; Markus & Tanis, 2000). These are comprehensive software packages supporting automation of most standard business processes in organisations including extended modules such as supply chain management (SCM) and customer relationship management (CRM). ES applications connect and manage information flows across organisations, allowing managers to make decisions based on information that accurately reflects the current state of their business (Davenport & Harris, 2005; Davenport et al., 2002). These systems are available from vendors such as SAP, Oracle and Microsoft, integrating various disparate facets of business such as sales and marketing, distribution, logistics, manufacturing, human resource management (HRM) and accounting into one integrated business system. The major benefits from ES implementation include integration and optimisation of business processes, automation of business transactions and sharing of context-rich information to support decision-making (Davenport et al., 2002; Hawking et al., 2004).

The market for ES grew by 14% in 2006 and continues to grow (AMR Research, 2007) as business becomes increasingly global and competitive. Because the market for large enterprise implementation is near saturation, for some time now all of the ES vendors are focusing on the small and medium-sized enterprise (SME) sector for sales growth (Shakir & Viehland, 2004). With this recent shift in direction, a number of research studies have been conducted to understand the opportunities and challenges of ES adoption in the SME sector. Many of these studies have focused on the differences of SME implementations in comparison to large enterprises in the context of pre-conditions, project behaviours, objectives, constraints, success factors and results achieved (Beck et al., 2002; Buonanno et al., 2005; Caruso & Marchiori, 2003; El Amrani et al., 2003; Federici, 2007; Koh & Simpson, 2007; Laukkanen et al., 2007; Ravarini et al., 2000; Raymond & Uwizeyemungu, 2007; Tagliavini et al., 2002). However, there has been little research to understand the impact of ES implementations on organisational effectiveness in SMEs (Hedman & Borell, 2002; Koh & Simpson, 2007), which makes it difficult to draw explicit conclusions about the impact of ES on organisational performance.

This paper reports on the expectation of SMEs from ESs and their current practices of ES implementation in a New Zealand (NZ) context. While the contribution of this paper is to better understand the impact of enterprise systems in SMEs, an ES vendor/consultant perspective is adopted, instead of the usual user viewpoint. Utilising a vendor/consultant perspective, interview data are collected from ES vendors, ES consultants and IT research firms who are the key players in the ES industry. This approach differs from the organisational approach usually found in the literature, which focuses on the users' perspective. The user's viewpoints are restricted to those of specific firms where the user may be working with limited ES exposure or knowledge in the field. The users may not be utilising the ES to the maximum, constrained by their functional knowledge. In contrast, the ES vendors/consultants are experienced individuals actively engaged with numerous SMEs in a variety of industries that are purchasing and deploying enterprise systems. The repository of knowledge this community has is shared with the reader in this study. This is a distinctive contribution of this study to the literature. Another important theoretical contribution is the development and use of a conceptual framework that will assist researchers to conduct ES benefit realisation studies in SMEs, as well as exploration and evaluation of ES implementation practices in future research.

The main purpose of this study is to better understand the business benefits SMEs expect from their ES investment. This research provides insights to the academic and practitioner communities about the business value SMEs seek through enterprise systems, insight that is mostly lacking in the literature.

The study also examines current practices of ES implementation in the SME sector, through a conceptual framework that considers the organisational, process and strategic contexts of the implementation. The study examines how ES implementation practices are adapting to be more suitable for ES deployment in small and medium-sized organisations. This aspect of the study replicates a similar study conducted approximately four years previously (Shakir, 2003), providing longitudinal data to track trend lines for ES implementation practices in a small country (New Zealand) context.

In summary, the major contributions of this study are four fold: (1) it provides a better understanding of the business benefits SMEs expect from ESs; (2) it informs academia and practice on how ESs are being implemented in SMEs; (3) it presents an information rich vendor/consultant New Zealand perspective, rather than a user perspective; and (4) it presents a conceptual framework for analysing ES benefits and implementation practices in current and future research.

This study is organised as follows. The first section introduces the literature, conceptual framework and research questions that are the basis for this research. The second section outlines the research methodology. The third and fourth sections present the empirical findings and the concluding section summarises the current status of ES implementation and offers suggestions for future research.

LITERATURE REVIEW

ES Implementation in SMEs

In recent years, several studies have investigated various aspects of ES adoption in SMEs. In comparison to large firms, when implementing enterprise systems, SMEs experience constraints in the transfer of knowledge (Laukkanen et al., 2007; Light & Papazafeiropoulou, 2004; Van Stijn & Wensley, 2005), in the initial set up costs (Schubert, 2003; Schubert & Leimstoll, 2004) and in the flexibility/rigidity due to ES once in operation (Federici, 2007; Melin, 2003). Whereas large enterprise implementations have emphasised outward business integration, in SMEs business development and efficiency improvement are the critically important factors (Laukkanen et al., 2007). In a manufacturing context, SMEs that have a high commercial dependence in areas such as production quality, cost reduction and flexibility are internally predisposed to ES adoption. SMEs that have design/R&D, marketing and distribution partnerships with external business partners are externally predisposed. SMEs that have a low level of commercial dependence, a diversified customer base and few marketing, product design and R&D partnerships, are not favourably disposed to ES adoption (Raymond & Uwizeyemungu, 2007). Finally, the justification for adopting ES centres on anticipated business benefits from the enterprise systems, as explained in the next section.

Business Benefits

The types of benefits that companies might anticipate from their ES implementation, and the extent to which organisations have actually attained those benefits on a post-implementation basis, are areas being proactively pursued in the academic and professional literature (e.g., Cooke & Peterson,

1998; Davenport et al., 2002; Deloitte Consulting, 1998; Donovan, 1998; 2001; Hedman & Borell, 2002; Itner & Larcker, 2003; Jenson & Johnson, 2002; Markus & Tanis, 2000; Robey et al., 2002; Shang & Seddon, 2000; Shanks et al., 2000; Soh et al., 2000; Yang & Seddon, 2004). Some of the commonly recognised benefits from these studies include business process improvement, integration among business units, real-time access to data and information, standardisation of company processes, increased flexibility, increased productivity, increased customer satisfaction, an optimised supply chain, business growth, improvement in order-to-cash time, competitive positioning ability, shared services, improved time-to-market cycles and improved product quality. Some other benefits obtained by SMEs as a result of ES implementation are related to simplification of internal procedures such as a much easier information retrieval, an improved performance management and increase in production efficiency (Federici, 2007). ES adoption can also create a competitive advantage to SMEs by making them more responsive and agile to change (Koh & Simpson, 2007).

This study extends this literature by examining the benefits SMEs expect from their enterprise system from the perspective of the ES vendor and consultant communities. Most studies (e.g., Federici, 2007; Koh & Simpson, 2007; Laukkanen et al., 2007; Raymond & Uwizeyemungu, 2007) offer an organisational perspective, utilising data gathered from ES users or managers in an individual firm or small group of firms. In this study, ES vendors and consultants who are responsible for multiple implementations in a variety of industries and business sectors offer insight into benefit expectation in the SME community.

ES Implementation Practices

Despite the recent and rapid development of mid-range enterprise systems targeting SMEs, there has been little research to evaluate implementation practices in the SME sector. In Shakir's (2003) study, the practices of ES implementation in New Zealand (NZ) SMEs indicate most initial implementations are completed with two or more core modules, including financials. The time for implementation varies from 2.5 months to two years. More ES implementations in the SME sector are multi-site with a preference to use the vendor as the implementer. The number of ES users are around 100 per implementation and cost of implementation is between NZ\$700,000 and NZ\$3M. Recent research has suggested that adoption, implementation and management of enterprise systems in SMEs is difficult (Laukkanen et al., 2007), but the practices of ES adoption have remained largely unexplored. This study fills this gap by examining the determinants for ES implementations in SMEs based on a set of organisational, process and strategic contexts and from an ES vendor/consultant perspective.

A conceptual framework (see Figure 1) developed by the authors, is used to examine the ES implementation practices in SMEs. The framework takes into account the organisational, process and strategic contexts of ES implementation, and each context is explained further below. In this study, the elements of this conceptual framework are examined through the viewpoints of vendors and consultants in the ES industry. These individuals are experts in the ES industry and are the most knowledgeable to provide a comprehensive interpretation of ES implementation practices in the current SME market. A similar methodology was used by Shakir (2003) utilising the process and organisational elements of ES adoption for investigating ES implementation practices in NZ from a vendor/consultant perspective. The focus of that study was to identify key drivers influencing typical ES implementations (e.g., Shakir and Viehland, 2004) whereas the focus of the current study is on the realisation of business benefits from ES. This study develops a more holistic framework that illustrates the interrelationship between organisational, process and strategic contexts of ES implementation leading to ES adoption in SMEs for achieving business benefits. We believe this

framework provides a more comprehensive and useful lens through which to analyse ES implementation practices and their business benefits in SMEs.

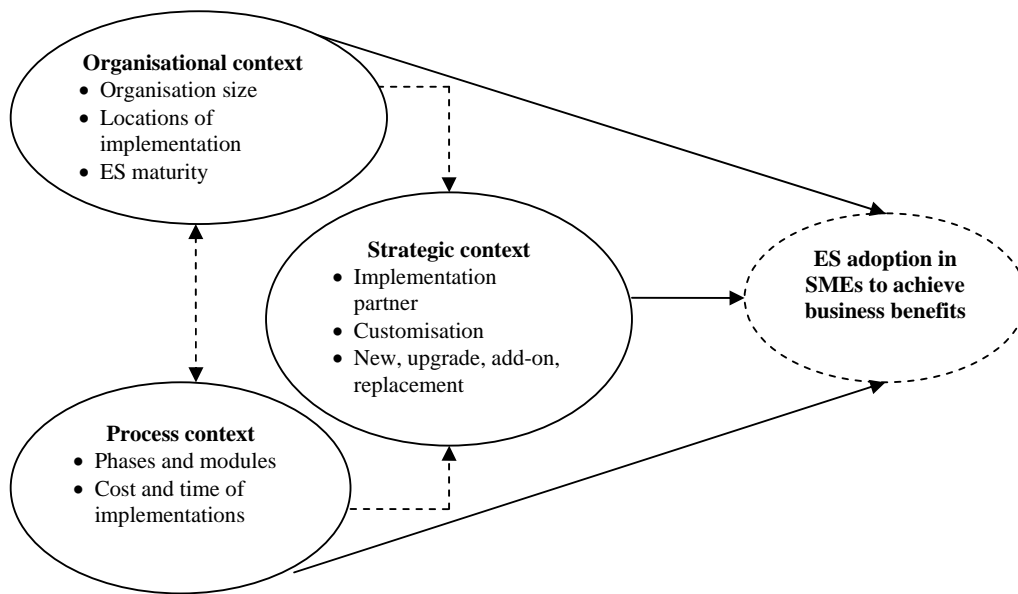


Figure 1: ES implementation determinants for ES adoption in SMEs

Organisational context

Significant differences exist between small, medium-sized and large enterprises in terms of revenue, number of employees, number of ES users and their locations of implementation. These elements mostly determine the organisational context for ES implementation practices. In the past, the revenue for small organisations was NZ\$10M-\$50M with 25 ES users, the revenue for medium-sized organisations was NZ\$51M-\$250M with 100 ES users and revenue for large companies and government agencies was more than \$251M (Shakir, 2003). In an Australian study (Parr & Shanks, 2000), the number of ES users for small firms were less than 100 users, for medium-sized organisations were 101-200 users and large organisations were more than 200. In the past, multi-site implementations in NZ were found more commonly in SMEs in comparison to large organisation implementations in which each location had its own separate implementation (Shakir, 2003).

ES maturity in an organisation depends on the number of years of experience the organisation has had with ES and the stage of ES implementation (Hawking et al., 2004). This concept of ES maturity and the different stages of ES implementation is reinforced by the Nolan and Norton Institute (2000) classification that groups implementations into levels of maturity such as beginning when ES has been implemented in the past 12 months, consolidating when ES has been implemented between 1 and 3 years and mature when ES has been implemented for more than 3 years.

Process context

There are different phases or “waves” of ES implementation. The core operational modules such as finance, sales and distribution, production planning, materials and production management are implemented in the first wave (Shakir, 2003). The second-wave ES (also called ERP II by Gartner

(Zrimsek, 2002)), includes the extended enterprise through modules for customer relationship management, advanced planning and scheduling systems (APS), supply chain management and collaborative commerce in a Web-based environment. These modules are replacing the current ES thus requiring companies to upgrade (Dalal et al., 2004).

ES vendors have changed their business model and moved toward a component strategy, often Web-based, that has separated ES systems into modules. The design and implementation of an ES involves capturing the information necessary for implementing the system's structure and behaviour that support enterprise management (Monnerat et al., 2008). A related development is a consensus on the need for interoperable components and/or modules that can be customised to model a particular enterprise as close as possible to its actual way of doing business (Nicolaou, 2004).

The costs of implementation are related to the number of modules, their types, the software package size and brand, the number of user licenses, training, hardware and implementation costs paid to the vendor, consultant and/or implementation partner. Time of implementation is determined by a number of factors, many (e.g., size of implementation, modelling the organisation, configuring the design) that are closely related to cost.

Strategic context

ES implementation is not a solitary, independent exercise. An implementation partner is mostly used for managing the ES project. Especially, in response to knowledge barriers that hinder technology diffusion, new mediating institutions (e.g., service bureaus, consultants) have come into existence which have progressively lowered those knowledge barriers and made it easier for firms to adopt and use the technology without extensive in-house expertise (Attewell, 1992).

Customisation is the process in which changes are made to the ES software during the implementation phase to suit the needs of the organisation in which it is being implemented. Customisation is necessary when the best business practices embedded in the ES software do not satisfy the needs of the business, and the software is changed to meet the requirements of the organisation (Davenport & Prusak, 1998; Kumar & Van Hillebergersberg, 2000). There are two principal implementation strategies for customisation, and variations between them. The first is "comprehensive customisation", when many and sometimes major changes are made to the software to satisfy business requirements. The second is "vanilla implementation", when the ES software application is implemented without any changes to the software and the business processes within the organisation are changed to suit the functionality of the software.

An implementation is considered new when it is implemented in an organisation for the first time. An upgrade is when a revised version of the software with some additional functionality is implemented to upgrade the existing software in the current implementation (Dalal et al., 2004). Add-ons, also called bolt-ons, include adding new modules to the existing implementation. Replacement means changing the existing implementation with a different vendor's software.

Research Questions

Based on the purposes of the study and this literature review, the research questions examined in this study are:

- a) What are the key business benefits that small and medium-sized organisations seek through the utilisation of an enterprise system and its information?
- b) What are the current enterprise system implementation practices in the small and medium-sized enterprise sector?

As emphasised earlier, this research builds on and extends existing ES research by the utilisation of a vendor/consultant perspective. A study of technology diffusion found that adoption of complex technology is dependent on organisational learning, skill development and knowledge barriers (Attewell, 1992; see also Rogers, 2003). That same study found that mediating institutions, such as the ES vendors and consultants who are part of this study, provide the technology and the know-how, making it easier for firms to adopt and use the technology.

The ES vendor/consultant perspective offers unique insight to addressing the research questions because these individuals have considerable experience in the ES industry and are actively engaged in ES implementation across several industries and business sectors. A systematic analysis of their knowledge yields new understanding about ES benefits and implementation practices in the SME sector.

RESEARCH METHODOLOGY

Research Design

The design of this research links the data to be collected and the conclusions to be drawn to the initial questions of the study. The epistemology underlying this research utilises a positivist approach based on semi-structured interviews conducted with key representatives in the ES industry for reliable and objective findings. The ontology of this paradigm assumes that the reality of the phenomena is objective, singular and independent from the researcher. Rigor is achieved by providing explicit research questions, *a priori* specification of constructs, a clear focus for the analysis and the context of the study. The *a priori* specification of constructs, based on the ES implementation determinants for ES adoption in SMEs, is developed and shown in the conceptual framework in Figure 1. A similar approach was used by Shakir (2003), who also investigated ES implementation practices in NZ from a vendor/consultant perspective. In this respect, the current study replicates Shakir's earlier study. Data from Shakir's 2003 study were collected between November 2001 and May 2002; data in the current study were collected between February and August 2006. Insight is provided by comparing the two studies in the discussion section. This study also compares findings with other similar studies such as Parr and Shanks (2000) who studied ES adoption in an Australian context and Brehm et al. (2001) who investigated customisation in ES implementations, however these studies did not use the vendor/consultant perspective. The unit of analysis for this study are the vendors and consultants who were interviewed. The foci of analysis include (1) the key business benefits SMEs seek through ES and (2) the organisational, process and strategic contexts of ES implementation practices. Aspects of research context that are important for the study include the description of the setting where the research is conducted, specific period of time under investigation, data collection method, data collection periods and time spent on site by the researcher. These aspects are explained in the following sub-sections.

Sample

Using a qualitative survey research methodology, primary data were collected through a series of semi-structured interviews with key participants in the ES implementation industry. The interviews were carried out between February and August 2006 to evaluate the current practices of ES implementation. The participants were senior ES consultants or senior managers in organisations who are key players in the field of ES in New Zealand, principally major ES vendors, ES consultants and IT research organisations (see Table 1).

ES Vendors (Flagship ES products)	ES Consultants	IT Research
SAP NZ (SAP)	PricewaterhouseCoopers NZ	Gartner Limited NZ
Oracle NZ (Oracle, J.D. Edwards, PeopleSoft)	Ernst & Young NZ	IDC NZ
Microsoft NZ (Dynamics (earlier Navision))	KPMG Consulting NZ	
Infor NZ (Mapics, SSA Global (earlier BaaN))	EMDA NZ	
The positions of the participants included: director professional services, consulting manager, managing director, consulting practice director, partner group manager, vice president, consulting partner, general manager and business consultant.		

Table 1: Key informants for the study

Process

Contact was first established with the informants through email and by phone. An introductory letter briefly explaining the study and seeking an appointment for an interview was then sent to the informants. When the appointment was confirmed, the research information sheet and questions were sent to the participant. One face-to-face interview of between 60 and 90 minutes was conducted with each participant at their organisation. The informants discussed ES implementations based upon their perspective and experience in terms of their ES products, their clients and their implementation methodologies.

Analysis and Evaluation

The interviews were tape recorded and transcribed immediately after each interview. The Nvivo 7.0 qualitative software tool was used for data analysis using the condensation approach. This approach condenses the data into multiple groups according to pre-defined categories, which follow the scope of the research questions. There were no identifiable differences in viewpoints between vendors and consultants, and for this reason a unitary vendor/consultant perspective is reported in the findings and discussion.

RESEARCH FINDINGS AND DISCUSSION

Research Question 1: Findings on Key Business Benefits SMEs Seek Through ES

In this study, the business benefits that SMEs seek through utilisation of ES and its information were discussed at length with the informants. The results are summarised in Table 2 and further explanation, principally in the words of the informants, are offered in the following paragraphs.

SAP explained that many SMEs now adopt the supply chain operations reference (SCOR) model to identify their key performance indicators (KPIs). According to SAP some of the key business benefits sought by SMEs included reducing time for month-end closure of accounts, to get better information flow and transparency of transactions, to reduce head count due to automation, integration of processes to achieve seamless resource management and others as listed in Table 2.

PricewaterhouseCoopers (PWC) noted that SMEs are investing in technology for ultimately saving costs. *“Either their old systems are inefficient, costly to maintain, obsolete, outside support, or in some cases it is not a justification for benefit at all. It is a must do to maintain a continuity of*

processes.” In terms of the business benefits PWC suggested that SMEs are typically looking at head count reduction, improving process efficiencies and driving efficiencies in the supply chain are some of the benefits sought.

Participants	Business Benefits
SAP, OR, MS, EMDA	<ul style="list-style-type: none"> • Improve information flow
SAP, OR, MS, EMDA	<ul style="list-style-type: none"> • Reduce inventory and reduce out-of-inventory events
PWC, OR, MS, EMDA	<ul style="list-style-type: none"> • Improve process efficiencies
PWC, OR, MS,	<ul style="list-style-type: none"> • Overall cost reduction by automating functions
SAP, PWC	<ul style="list-style-type: none"> • Reduce head count
SAP, EMDA	<ul style="list-style-type: none"> • Increase information visibility
SAP	<ul style="list-style-type: none"> • Supply chain operations reference (SCOR) model KPIs
SAP	<ul style="list-style-type: none"> • Reduce month-end closure time
SAP	<ul style="list-style-type: none"> • Integration of processes to achieve seamless resource management
SAP	<ul style="list-style-type: none"> • Increase productivity and throughput
SAP	<ul style="list-style-type: none"> • Incorporate vendor-managed inventory (VMI)
SAP	<ul style="list-style-type: none"> • Become more agile and efficient
PWC	<ul style="list-style-type: none"> • Drive efficiencies in the supply chain
OR	<ul style="list-style-type: none"> • Automate processes
MS	<ul style="list-style-type: none"> • Improve response time
EMDA	<ul style="list-style-type: none"> • Transparency in costing information
EMDA	<ul style="list-style-type: none"> • Reduce work-in-progress
EMDA	<ul style="list-style-type: none"> • Improve bills-of-material management

Notes: OR = Oracle, MS = Microsoft, PWC = PricewaterhouseCoopers

Table 2: Key business benefits that SMEs seek through ES

The Microsoft respondent emphasised that typically SMEs are looking for efficiency through their people. The cost reduction is through not having to use as many people or by increasing throughput with the same number of people. *“In general, systems are put in to become more efficient and increase profit. Reducing cost through efficiency and increasing profit through reducing cost. That’s the number one that everybody wants. In a manufacturing context, planning and forecasting are absolutely essential and most people want to use the integrated systems to get their information because better information leads to those efficiencies that they need.”*

Oracle suggested that the business benefits depended on the modules implemented and many SMEs want to streamline specific functions, such as the procurement process or the financial process:

“The ES information helps take critical decisions such as whether the function should be centralised or de-centralised, how more money can be saved and can bulk purchases be organised instead of few at a time. A manufacturing company would look at demand planning. One of the typical problems in a manufacturing company is that the supplier agreements do not necessarily match the changing demand. The end result is a shortage of a particular component which has an impact on the assembly line. It is a huge cost. On the financial side, SMEs are trying to assess which measures from a financial perspective will best indicate the business’ health, can getting the right information required be automated, can reports be produced to provide sales figures for the previous week, or who are the organisation’s top consumers.”

EMDA identified some of the benefits SMEs want to achieve from an ES:

“First, it is inventory reduction which is generally achieved in the first phase. Second, improvements in the planning systems since SME organisations get the benefit of having a total picture and recommendations. Although their processes may not be perfect, the information on quantity required for procurement are quite accurate because these are derived from the demand. The third is the transparency in costing information since ES provides constant updating of purchase costing information. This makes the costing far more accurate and if the planning and scheduling are pushed from there, it can lead to shortened lead times which also reduce work in progress.”

Research Question 1 Discussion

The findings in Table 2 and the comments of the vendors and consultants emphasise three major areas in which SMEs seek benefits from enterprise systems. These areas are cost-savings (e.g., head count reduction, reduced inventory, a more efficient supply chain), information access (e.g., information flow, information visibility, information transparency) and process improvement (e.g., improve process efficiencies, automate processes, process integration). These general results (shown in Table 3) are consistent with what is in the literature, but never has such a comprehensive list (Table 2) been developed or with the multiple and cross-industry perspective available from the vendor/consultant community. As discussed later in this paper (see Table 4), most respondents agreed that it is predominantly medium-sized enterprises (20-200 users) which are currently implementing ES in NZ. For this reason, the ES benefits, as reported by vendors/consultants, are more likely to reflect those of medium-sized enterprises, more so than small enterprises.

Major Benefit Area	ES Benefits
Cost-savings	Head count reduction, reduced inventory, a more efficient supply chain
Information access	Information flow, information visibility, information transparency
Process improvement	Improve process efficiencies, automate processes, process integration

Table 3: Major ES benefit areas sought by SMEs

The business benefits from this study that relate to benefits from the ES literature (e.g., Cooke & Peterson, 1998; Davenport et al., 2002; Deloitte Consulting, 1998; Donovan, 1998; 2001; Hedman & Borell, 2002; Ittner & Larcker, 2003; Jenson & Johnson, 2002; Markus & Tanis, 2000; Robey et al., 2002; Shang & Seddon, 2000; Shanks et al., 2000; Soh et al., 2000; Yang & Seddon, 2004) include business process efficiency improvement, integration of business processes to achieve seamless resource management, improvement of information flow and access to data, increased productivity and throughput, an optimised supply chain, increase in production efficiency, inventory and cost reduction, and becoming more responsive with agility to change. These are generic benefits that most organisations seek and include all three major benefit areas of cost-savings, information access and process improvement, as summarised in Table 3.

Some ES benefits identified in this study (see Table 2) but which are not evident in earlier studies reviewed in this paper include improvement in supply chain operations reference (SCOR) model KPIs, incorporation of vendor-managed inventory (VMI) programme and improvement of bills-of-material management. These are new and current development areas where the improvement in operational processes has a huge impact in achieving process efficiencies and cost savings by organisations. These findings indicate the new benefit areas of interest to SMEs. These emerging benefit areas enable supply chain operational efficiencies and cost savings through the utilisation of information technology. These new findings build upon the existing ES benefit literature and

provide new directions for future research into how and why SMEs are able to realise such benefits utilising enterprise systems and their data.

Some more business benefits mentioned in earlier ES literature reviewed in this paper, but not cited in this study, include standardisation of company processes, increased customer satisfaction and business growth, improvement in order-to-cash time, competitive positioning ability, shared services, improved time-to-market cycles, improved product quality and improved performance management. This can be attributed to the bias of vendors/consultants that such holistic benefits are not adequately convincing to cite. This suggests vendors/consultants do not consider these benefits as important, or perhaps they are more difficult to persuade SMEs of, compared to the other benefits. A reminder that the earlier ES literature has used the SME perspective rather than the vendor/consultant perspective provided in this study. These findings indicate the growing awareness of SMEs towards seeking only those benefits that are more tangible and can be quantified in terms of benefit expectation. This insight contributes to the ES literature by explaining the growing ES maturity in SMEs and by identifying a new approach towards benefit expectations of SMEs. Future research can further examine this benefit expectation gap between the SME and vendor/consultant perspectives to evaluate whether the un-cited benefits are less sought after than the ones the vendors/consultants have cited, or any other reasons for these differences.

Research Question 2: Findings on Current Practices of ES Implementations by SMEs

While the primary purpose for the interviews with the ES vendor/consultant community was identification of business benefits, complementary data about current practices of ES implementation in SMEs were also collected. These findings are presented in this section to address the second research question: What are the current enterprise system implementation practices in the small and medium-sized enterprise sector?

Each of the elements of the organisational, process and strategic contexts are presented first, followed by a separate discussion section that compares these results with other studies in New Zealand and elsewhere.

Organisational Context: Organisation size

Most classifications of organisation size use number of employees and/or revenue (e.g., in the New Zealand business environment, 21-100 employees is medium size, 3-20 employees is small and less than 3 is micro). Another measure of organisation size that is more relevant for the participants in this study is number of users or "seats" licensed to use the ES software. A classification by consultancy firm IDC, provided as part of the current study, shows the sizes of companies based on the number of users where ES is implemented as a percentage of companies in NZ (see Table 4).

Size of Organisation	Number of Users	Percent in NZ where ES is Implemented
Large	>200	25%
Medium	20-200	49%
Small	<20	26%

Table 4: Number of users in NZ companies where ES is implemented

Most respondents agreed that current implementations in NZ are predominantly in the medium-sized enterprise category of 20 - 200 users. The large corporate and governmental agency sector is nearly saturated and the many small businesses in NZ find it hard to justify an ES investment from a cost perspective. When small organisations do invest in ES, they typically do not implement comprehensive enterprise solutions from large vendors. These businesses prefer smaller inexpensive

fragmented solutions. However, the major vendors have also moved their business model and are now targeting smaller sites with products such as Business One from SAP.

Microsoft estimated that there are about 3,500 medium-sized companies in NZ. Microsoft believes they have 400 of these as their current customer base (Microsoft's largest customer in NZ has a user base of 130; the majority of customers licence 15-50 seats). Many of the other medium-sized firms are not using traditional ES as their core technology. A large proportion of these businesses did not have any technological solution to help them with their business problems and they represent a growth market in NZ.

Other participants confirmed this view as the typical small firm and even some medium-sized organisations are using home grown PC-based systems or disparate non-integrated systems, in which their usage has outgrown the technology. The software vendors are trying to push into this market, although there are many challenges such as limited resources, lack of infrastructure or lack of necessary in-house skills to cope with changing requirements associated with implementing an ES.

The challenge facing software vendors is to figure out how they take the learning acquired in the large enterprise implementations down to a smaller enterprise. Some informants believe it is a fallacy to believe that small organisations require different information. They actually require quite the same information as a larger organisation, but to a different degree.

Organisational Context: Locations of implementation

Findings in this study show that currently more implementations are multi-site, whereas in earlier years implementations were mostly single site (in this context, locations are the one or more sites where the ES is implemented). Especially, SMEs are now using one implementation at multiple locations. "Organisations are realising it's no use having IT administrators in all the locations doing a similar task." The growth in the NZ export market coupled with availability of Internet-capable technology are also factors driving multi-site ES implementations in NZ, according to respondents. As explained by SAP, one installation of the software is on one server in the business centre, but the software is used at multiple locations, for example, subsidiary sites, distribution warehouses and sales offices.

Organisational Context: ES maturity

Most informants agreed that ES maturity has occurred at a slow pace in New Zealand organisations. This is mostly attributable to the small size of most NZ businesses. However, this trend is now changing and many SMEs are approaching a fairly advanced level of maturity with ES technology and IT in general. The informants identified the following four issues in managing ES projects which highlight the slower pace of ES maturity within the SME sector.

- Many New Zealand SMEs do not conduct a proper business justification of their implementation. Although some improvement has been made in the past few years, most New Zealand SMEs produce little or no value assessments and that often leads to weak business cases and insufficient benefit models which cannot be used for benefit tracking.
- Many SMEs in NZ believe implementation of ES is a technology challenge. However, according to most informants, it is more about people, process and change management, and less about technology.
- Informants revealed that typically when a new system is implemented, productivity drops for a period and then goes up. Oracle suggested the depth of the drop depends upon how well the system is implemented, how well the change process is managed, how well the

business case is defined and how well the managers are measuring and managing benefits before and after the implementation.

- Until a few years ago, the majority of SMEs did not use the ES in its true capacity. ES was used as a financial system, as a central repository for personnel records, or as a method for raising purchase orders. This was because the SMEs had not thought about what they were trying to optimise, what benefits they were trying to bring into the organisation, what they were trying to change, how they were trying to manage the business and whether they could actually get the information they needed to manage the business from the ES. However, software vendors now report that they see several SMEs seeking ways to get more value out of their ES investment. These companies have started asking how to establish analytical processes to optimise and realise business value from their ES investment.

Process Context: Phases and modules

Most informants confirmed the suggestions in the literature that ES implementations are typically divided into two “waves” or phases. In New Zealand SMEs, the first wave or phase 1 is the implementation of core ES modules such as finance; materials management including purchasing, warehousing and inventory; and operational modules including, as appropriate to the business, production management, production planning, logistics, sales and distribution. Some companies also include HR and payroll in the first phase. In the second wave or phase 2, the companies implement supplementary modules which include collaborative scenarios such as CRM, SCM and supplier relationship management (SRM) as well as management services applications such as business intelligence (BI).

According to the respondents, many of the New Zealand larger medium-sized organisations have already completed their first phase of ES implementation and are now extending into the second phase with CRM, SCM, or BI. This can be directly attributed to advancing ES maturity in the New Zealand SME market – these firms have now started realising the value of technology and are using it to stay ahead of competitors.

Process Context: Cost and time of implementation

According to informants in this study, in the SME sector, cost is the most important factor in selecting an ES for implementation. This is attributed to the limited funds these firms have for investment. One vendor also explained that SME implementation costs are smaller because the operations are less complex and they require fewer customisations. SME decision making processes tend to be more efficient and smaller companies are more agile, more decisive and especially more inclined to adopt a best practices implementation.

With the shifting focus towards SMEs, ES implementation time has decreased, according to all the respondents. Although the time for implementation varied between different respondents, the general consensus was that currently large projects take around 12 to 24 months and SMEs 3 to 12 months to complete.

Strategic Context: Implementation partner

An implementation partner is mostly used for managing the ES project. Findings revealed that while a third party or a consultant implementer was popular in the past for large organisation implementations, both large firm and SME customers now prefer the software vendor’s direct involvement. A majority of the participants in the current study suggested that there has been a shift over the last five years. Customers traditionally preferring to work with the big 5 consulting

companies for implementation are now more inclined to work with the software vendor directly so that they have a one-stop shop. All firms, regardless of size, are starting to realise that the technical skills a software vendor provides may not be possible from consultants. One vendor explained what customers feel is that unless they actually talk to the software owners, they may not get the best value from a price perspective and from the perspective of having the best experts involved in the project.

Strategic Context: Customisation

The findings from this study revealed that vanilla implementations are much more the norm in SMEs, in comparison to larger organisations. This is not surprising considering the desire for SMEs to reduce the cost of implementation and related factors noted earlier (e.g., less complex, efficient decision making processes, agility, decisiveness). Smaller organisations are also likely to prefer or even insist on adherence to the pre-defined best-practice business processes in the software and be willing and able to change their own processes to the software's requirements. These SMEs are more likely to be successful in capturing the benefits, controlling the cost of the implementation in future upgrades and reducing the overall cost of ownership.

Strategic Context: New, upgrade, add-on, replacement

Participants in this study suggest an equal split between new implementations versus upgrades, add-ons and replacements in both large and SME organisations. SAP suggested *"We're definitely focusing on new implementations because that's where our goal is. However, we have to look after our existing customer base and as their requirements change, the presentation of our software in their business may also need change."* In the case of replacements, Oracle noted that an organisation will replace an ES only if there is a need to satisfy some major benefit which remains unsatisfied in their existing system, because it is expensive to replace. It is not just the cost of the software, but it is the huge organisational change that the company has to go through to replace an enterprise system. Oracle also revealed that in the past this cost was underestimated, but *"replacement cost is three times the cost of upgrade."* Oracle also commented on the maintenance aspect, which includes the cost of upgrading the ES. *"Typically in every five-year period, companies spend up to four times the initial purchasing implementation cost, just to maintain the ES. That is why IT budgets in organisations allocate substantially for upgrade support as opposed to new requirements."*

Research Question 2 Discussion

The number of ES users in an organisation can be a determinant for the size of organisation implementing an ES. Most respondents in this study agreed that current implementations in New Zealand are predominantly in the medium-sized organisation category of 20 - 200 users (see Table 4). These findings are similar to results from a similar study (Shakir, 2003) in NZ four years previously in which the majority of implementations were found to be in medium-sized organisations with approximately 100 users. An earlier Australian study (Parr & Shanks, 2000) also categorised organisations by number of users: small firms were less than 100 users and medium-sized organisations were 101-200 users. The variation in number of users between the Australian and New Zealand context points out that organisation size may be defined differently between countries, largely depending on the size of the country and its economy. Research findings from the current study indicate that the ES implementation focus has moved from large to medium-sized organisations. The findings also confirm that the majority of small organisations in NZ, those with less than 20 employees, have not ventured into an implementation from a large ES vendor yet, due to the cost factor. The first implication for future ES implementation and post-implementation

evaluation studies is that they must focus primarily on the medium-sized organisations, where the majority of ES implementations are occurring. Second, future research must also conduct ES requirement analysis and evaluate implementation trends in small organisations to enable vendors to create software suited to the needs of small companies and, critically, at a price these companies can afford.

Findings in this study revealed that first phase ES implementations frequently include the implementation of core ES modules such as finance, purchasing, warehousing, inventory and, sometimes, operational modules, human resources and payroll. These findings differ from the Shakir (2003) study, which included financials plus one or two other modules in first phase implementations. This change could be attributed to the larger number of modules that ES vendors have put into the market in the last five years, or perhaps that SME owners are more ambitious in phase 1 implementations with decreases in time, cost and complexity in the module installation. Further research is needed to confirm this or to determine other reasons for more ambitious first phase implementations.

Four years ago, the length of time for first phase implementations in NZ varied from 2.5 months to 2 years (Shakir, 2003). In the current study, although the time for implementation varied between different informants, the general consensus was that most projects with large organisations take 12 to 24 months and those with SMEs took 3 to 12 months (Shakir did not distinguish implementation time between SMEs and large organisations). As the time for implementation reduces, so does the cost. An opportunity for future case study research is to identify implementation practices that have successfully reduced the implementation timeframe and improved return-on-investment. This will benefit all organisations, but especially SMEs.

Many of the other findings either confirmed the results found by Shakir, or are an extension of the trend lines identified in the earlier study. For example, this study confirmed the findings of Shakir (2003) that SME customers continue to prefer the software vendor's direct involvement as an implementation partner; that cost is a factor that encourages vanilla implementations without extensive customisation; and that the trend of an increasing proportion of multi-site implementations continues.

Regards vanilla and multi-site implementations, Parr and Shanks (2000) reported in their study on different ES implementation approaches that vanilla implementations are usually single site and comprehensive multi-site. However, the current study suggests that vanilla implementations could be single or even multi-site and currently more implementations are multi-site. This change could be attributed to improvements in ES technology in the past decade. Earlier, the software required comprehensive customisation to integrate ES data across different company sites. Current ES software architecture provides the multi-site function as a pre-configured business process. Therefore, more organisations currently use the multi-site function as part of a vanilla implementation. Future research can further explore the utilisation of multi-site functionality in vanilla implementations and evaluate their outcomes.

The results from this study found that SMEs prefer to adhere to the pre-defined business processes in the ES software and change their own processes to the software's requirements. The companies doing this are more likely to be successful in capturing the benefits, controlling the cost of the implementation, facilitating future upgrades and reducing the overall cost of ownership. These findings confirm the results found by Brehm et al. (2001) in which they estimated that with greater customisation the more likely it is that the implementation will encounter difficulties, suffer on cost, schedule and performance metrics and experience difficulties when attempting to upgrade to a later package release. Further research is recommended to explore this phenomenon in light of changing ES architectures. The trade-off between adhering to the software's pre-defined business processes

and modifying the software to suit the specific needs of the organisation through customisation is an area that is scrutinised in most implementations. Research that explores this phenomenon in the light of the current ES technology available from the different vendors and to quantify more precisely the costs and benefits of this trade-off would be of immense interest to both practitioners and academia.

The development and utilisation of the conceptual framework (Figure 1) has proved beneficial in the conduct of this study and is a major theoretical contribution. The framework provides a broad and comprehensive approach to the evaluation of ES benefits and implementation practices. The framework has not only helped in analysing the business benefits and the implementation practices, but encapsulated the findings of both of these aspects into one holistic framework that provides increased clarity into the business benefits SMEs receive from enterprise systems implementations.

CONCLUSIONS

Several key findings have come out of this study based on the ES vendor/consultant perspective. First was the exploration of business benefits that SMEs expect from ES implementation (research question 1). The key benefits (mentioned by more than one informant) include:

- Improve information flow
- Reduce inventory and reduce out-of-inventory events
- Improve process efficiencies
- Overall cost reduction by automating functions
- Reduce head count
- Increase information visibility

A second key finding related to both research questions explored in this study (i.e., benefit expectation and implementation practice) was that New Zealand SMEs are still weak in proper business justification of their implementations. An emphasis on the determination of clear goals and objectives at the project outset is one of the important factors for ES implementation success (Plant & Willcocks, 2006). This factor was found lacking in many ES implementations in NZ SMEs. Specifically, as reported in the discussion of ES maturity, NZ SMEs produce little value assessments that often lead to business cases and benefit models which cannot be used for benefit tracking. Although some improvement has been made in the past few years, these companies have only recently started asking how to establish analytical processes to optimise and realise business value from their ES investment.

The implications for business are clear. Software implementations require considerable investment, not just in software and consultant costs but also internal time. To ensure the investment is sound, it is in the organisation's interest to prepare a business case that considers expected benefits from the new software for the money that is being spent.

Another comment made in the conduct of this study also deserves repeating. Many SMEs in New Zealand still believe implementation of ES is a technology challenge. However, the experiences of the participants in this study confirm the widely held view in the ES industry that implementation success is more about managing people and processes. More general managers and owners of small and medium-sized organisations need to realise this.

This research also provides value to academia and informs the literature by building upon earlier studies such as evaluation of business benefits sought by New Zealand SMEs and their implementation practices. Finally, the ES adoption constraints from previously published literature (e.g., Federici, 2007; Laukkanen et al., 2007; Light & Papazafeiropoulou, 2004; Melin, 2003; Schubert, 2003; Schubert & Leimstoll, 2004; Van Stijn & Wensley, 2005), such as knowledge constraints, cost constraints, operational constraints, change management constraints and outward business integration constraints significantly conform to the findings of this study. This is mostly attributable to the small size of businesses in New Zealand and the slow pace of ES maturity.

There are several new insights this study provides to the ES benefit literature, especially in the context of SMEs. First, the conceptual framework developed for this study (see Figure 1) has been a useful tool for examining ES benefit realisation and can be used in future research. Second, never has such a comprehensive list of ES benefits been developed (see Table 2) and never from a vendor/consultant perspective. Third, this study has categorised the comprehensive list of benefits into three major benefit areas (see Table 3) and identified new benefits that support cost savings and improvements in operational efficiency (e.g., vendor-managed inventory programmes). Fourth, this study has found that SMEs are principally seeking tangible benefits from their vendors/consultants, benefits that can be quantified in terms of benefits sought.

This study also provides new insights on the current ES implementation practices in SMEs, findings not identified in previous research. First, SMEs are now installing a larger number of modules in the first phase of implementation. Second, not only are first phase implementations more ambitious, but they are also becoming more efficient in terms of time and cost of implementation. Third, ES implementations in all firms are becoming more vanilla – little or no customisation – and across multiple sites. The vendor/consultant perspective is that this can be attributed to the availability of various system functions as pre-configured business process as ES technology architectures improve. These insights are new contributions to ES literature and provide immense value to both academia and practitioners.

There are several limitations to this study. The findings are limited to the views of ten professionals from different ES vendor, ES consultant and IT research organisations specifically in a New Zealand context. For this reason, the findings might not be applicable in other national contexts. Also, while precautions (e.g., anonymity) to ensure forthright responses would be forthcoming, there could have been some influence by the commercial interests of the participant's firm. However, these individuals do represent a diverse set of professionals with considerable seniority and experience in the ES industry in NZ and overseas and positioned in key international firms in the industry.

Furthermore this research is being extended to analyse the critical effectiveness constructs identified in this study and address any apparent bias. Case studies are being conducted in a few New Zealand SMEs to investigate the differences between the perspectives of the consultants and vendors, and the real-life experiences of the organisations, where ES implementations are realised. Another suggestion for future research is replication of this study, especially including the vendor/consultant perspective, in other countries.

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